

U.S. ARMY ENTERPRISE SOLUTIONS COMPETENCY CENTER

Enterprise Resource Planning Reference Guide





Introduction

Historically, substantial sums of money have been spent when lessons learned have been ignored, or overlooked. Recent GAO reports have criticized the Services for not paying attention when important lessons are being learned. The purpose of this reference guide is four-fold:

- To provide a high-level overview of Enterprise Resource Planning,
- To make critical success factors accessible to decision makers,
- To offer mitigating strategies as you move through complicated business transformation processes, and
- To define a common language as seen in Enterprise Solution Definitions.

The Enterprise Solutions Competency Center (ESCC) has been established to provide the Army an in-house capability to assist acquisition decision makers, and functional domain leadership in the complex landscape of business transformation, and the supporting information technology. The ESCC is staffed with government and industry experts with the overall mission to provide solutions with enterprise services.

"The problems that exist in the world today cannot be solved by the level of thinking that created them."

Proprietary Systems

- ➤ MRP (Material Requirements Planning)
- >Integrated forecasting, scheduling
- >1960s 1970s

MRP II

- >Multi-product manufacturing management
- >Usually includes some accounting integration
- ≥1980s

ERP

- ➤ Integrates other enterprise business processes with MRP II, including sales, logistics, financial management, etc.
- ≥1990s

ERP II

- Componentized to include CRM, SCM, APS, and other distributed components
- > Rapidly evolving to service-orientation
- ≥2000s

What Are ERP Systems?

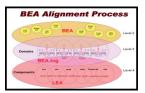
Proprietary Systems

- ➤ ERP systems fall within a general class of business information systems that are called Enterprise Systems.
- >Enterprise Systems are enablers of Organizational Transformation.

O ESCC Key Concept

The Requirements for Enterprise Systems Are Documented in Solution Architectures!

- ➤ A Solution Architecture shows how systems align with organizational processes within and across natural boundaries. The boundaries could be organizational stovepipes, software boundaries (Enterprise, proprietary, or legacy), budgetary, or other relevant partitions of an enterprise
- Architectural components are: who, what, how, when, why and where.
- Architectures are like Blueprints or Drawings of a solution that enables an organization.
- An Architectural Framework is a Collection of Elements assembled for some Purpose. The focus is on Transition and Implementation.



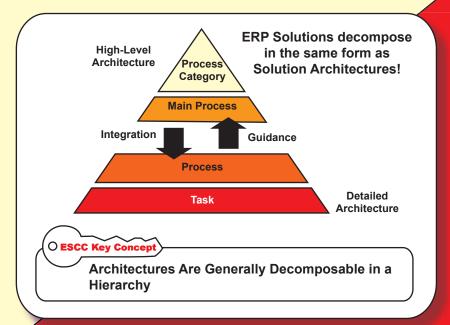
➤ Policy Architectures: Translates policy documents into execution guidelines



> Descriptive Architectures: Documents how organizational objects interact



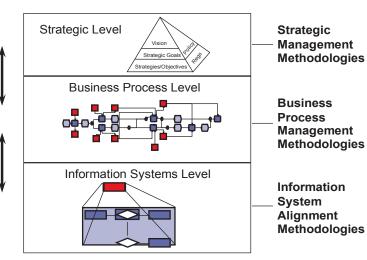
>Solution Architectures: Documents how integrated software aligns with organizational boundaries (i.e. SALE/SAFE)

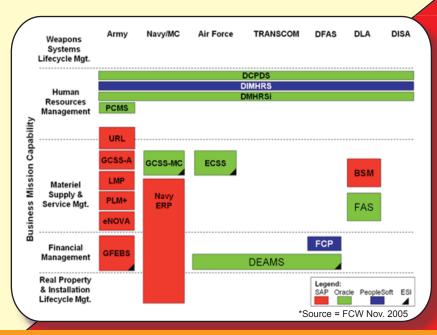


Modern Integrated Organizations

Strategic Objectives Are Formally Linked to Business Processes

Information Systems Are Formally Aligned With Business Processes





US Govt Spending for FY04, \$5.6 Billion* 9

Top 10 Reasons Implementations Fail

- Governance No single person in charge who reports directly to senior executives.
- Scope The implementation contract doesn't align with an enterprise solution, but is aligned with programs, systems, or other nonenterprise artifacts.
- Change Management Insufficient investment in Change Management initiatives.
- Skills Implementation team doesn't have a thorough understanding of enterprise technologies.
- Decision Making Consensus decision making as opposed to rapid decision making.
- 6. Communications Lack of communication at all levels.
- Solution Architecture No solution architecture and appropriate implementation methodology.
- 8. **Training** Insufficient investment in project team and user training and executive education.
- Culture trying to force the enterprise software into a stovepiped culture.
- 10. **Leadership** lack of project continuity because of leadership.

Governance

- Is the project controlled by an enterprise solution architecture? (See Critical Success Factor #4).
- Is the appropriate monitoring and performance evaluation system in place? (See Critical Success Factor #7)
- 3. Do you have the appropriate project management structure for an enterprise initiative? (See Critical Success Factor #6)
- 4. Is the single person in charge a civilian who reports directly to the most senior executive in the enterprise? (See Critical Success Factor #9)
- Do you have the right type of Senior Management Support and Leadership? (See Critical Success Factor #14)

Important Questions to Ask

Management

- Is there a Solution Architecture that defines the end state, and is the appropriate implementation methodology being used? (See Critical Success Factor #4)
- 2. Do you have the right implementation team? (See Critical Success Factor #13)
- 3. Does the implementation team understand the technologies, and does the project management team understand the business and the technologies? (See Critical Success Factor #13)
- 4. Is your business plan, including the plan for integration, shared by all senior leaders? (See Critical Success Factor #2)
- Do you have a formal communication plan, including funded communications projects? (See Critical Success Factor #10)

Acquisition

- Does the contract align with the enterprise solution? (See Critical Success Factor #1)
- Do you have a sufficient budget for project completion? (See Critical Success Factor #3)

O ESCC Key Concept

It Is Highly Probable that the Army Will Operate on a Federated Architecture

CSF #1: The Contract

- The contract must align with the solution not a system, program or initiative.
- >The contract must preserve the natural business process boundaries of the software; not the organizational or financial boundaries of the receiving organizations.

O ESCC Key Concept

Current Public Sector Contracting Models Are Not Appropriate for Enterprise Transformation Efforts!

CSF #2: Business Plan and Vision that Documents a Realistic Scope and Expectations

- Successful ERP projects require a clear vision of how the organization will meet strategic goals for the business processes in question.
 - The vision must be shared.
- Companies with executives who understand the problems and opportunities and set realistic ERP goals have a higher chance of success.
 - A good understanding of ERP, including the magnitude and duration of the effort, helps executives set realistic expectations.
- >A clear business plan and vision to steer the direction of the project is needed throughout the ERP lifecycle

continues . . .

Business Plan and Vision that Documents a Realistic Scope and Expectations (cont.)

- The project should be related to business needs and the needs should be clearly stated
- A business case that documents tangible benefits, costs, and risks must be produced
- >Benefits and costs must be identified and tracked

O ESCC Key Concept

Misperceptions and Misunderstandings about ERP Are Common. Senior Executive Expectations May Not Be Realistic – They May Want Success Within a Few Months, when the Design and Implementation of a Project May Take Two Years

CSF #3: Sufficient Budget for Project Completion

- Companies frequently undertake ERP projects with inadequate funding for completion.
- Managers often erroneously believe that ERP projects can be selffunding throughout their lifecycle, even in the short term.
 - ERP is problematic for organizations in poor financial condition.

O ESCC Key Concept

To Achieve Success, a Company Must Create an Adequate Budget and Be willing to Invest to Achieve Integration!

CSF #4: Define the End State

- A solution architecture that defines the end-state, and the ability to manage/monitor relative to the end-state is critical to success
- An appropriate public sector implementation methodology must be used
 - methodologies that were designed for managing weapon system development are not appropriate for managing organizational transformation

O ESCC Key Concept

DoD 5000 Is Not Optimized for Enterprise Transformation!

CSF #5: Architecture, Testing, and Troubleshooting

- >The overall solution architecture should be established before deployment, taking into consideration the requirements of the implementation
 - This prevents reconfiguration
- The organization should work with vendors and consultants to resolve software problems
- Quick response, patience, perseverance, problem solving, and firefighting capabilities are important
- >Vigorous and sophisticated integration testing must be pursued
- Modeling methods, architecture, and tools are critical
- >There should be a plan for migrating and cleaning data
- Proper tools and techniques, including the skills to use these tools, should be adopted.

O ESCC Key Concept

You Would Not Build a House from a Photograph, so Why Would You Implement ERP from PowerPoint or Visio?

CSF #6: Project Management

- >A single individual should be given project management responsibility
- >The scope must be clearly defined
- Any proposed changes should be evaluated against the business case
- Scope expansion must be evaluated relative to additional time and costs required
- The project must be formally defined in terms of milestones
- >The forcing of timely decisions must be managed
- Deadlines must be met to stay on schedule, and within budget to maintain credibility
- >Project management must be disciplined and coordinated with training

continues . . .

Project Management (cont.)

- There should be planning of well defined tasks and accurate estimation of required effort
- > Delivering early success is important
- >Rapid, successive, and contained deliverables are critical
- Constant tracking of schedules and budgets against actuals are critical

O ESCC Key Concept

Follow the Software Provider's Recommended Work Breakdown Structure

CSF #7: Monitoring and Evaluation of Performance

- >Achievements should be measured against project goals
- >The progress of the projects should be monitored actively through set milestones and targets
- Project management criteria should be used to measure against completion dates, costs, and quality
- >After go-live, operational criteria should be used to measure against the production system
- Monitoring and feedback include the exchange of information between project team members and the analysis of user feedback
- ➤ Management must be provided information on how the new system affects business performance
- >Performance should be tied to executive compensation

O ESCC Key Concept

If the Wrong Achievements are Measured, or if the Measures Are not Seriously Managed, the probability of Success Is Diminished!

CSF #8: ERP Teamwork and Composition

- ➤ Empowered workers with a collaborative work style are needed as members of cross-functional teams, both during and after an ERP project.
- The team should have a mix of consultants and internal staff so the internal staff can develop the necessary technical skills to support the implementation
- ➤ The ERP project should be the team's only priority and the workload should be managed
 - •The team members must be full-time dedicated to the project.
- The team should be incentivized to implement the system on time and within budget
- Implementation team members must be trained in critical ERP concepts.

continues . . .

ERP Teamwork and Composition (cont.)

- The team should be familiar with the business process and the ERP products
- Information must be shared between the company and the consultants
- ➤ Partnerships should be managed with regularly scheduled meetings
- ➤ Incentives and risk sharing agreements should be used throughout the implementation lifecycle
- Enterprise-wide culture and structured change should be managed
- A culture with shared values and common objectives is conducive to success

continues . . .

ERP Teamwork and Composition (cont.)



Empowered Team Members Are Needed During a Project to Identify and Redesign Business Processes and to Assist in the Configuration of the ERP Software. After Go-Live, the Same Team Members Must Execute the New Business Processes on an Ongoing Basis.

CSF #9: Project Champion

- Project sponsored commitment is critical to drive consensus to oversee the entire implementation lifecycle
- There must be a high level executive sponsor who has the power to set goals and legitimize change
- >A single business leader should be in charge so there is a business perspective
- >The leader must continually strive to resolve conflicts and manage resistance.

continues . . .

Project Champion (cont.)

O ESCC Key Concept

ERP Projects are Likely to Fail if they Have the Wrong Champion. The Wrong Sponsor Is:

- Too Low in the Management Ranks,
- Too Technically Focused,
- Getting Ready to Retire or Change Jobs,
- Unable to Manage the Consultants (i.e., Allows the Consultant's Run the Show)
- Insistent on Moving Forward with ERP when ERP Is not Appropriate

CSF #10: Effective Communication

- It is almost impossible to over communicate when an ERP implementation is underway.
- >Expectations at every level must be communicated
- Communication includes the formal promotion of project teams and the advertisement of project progress to the rest of the organization
- >Middle managers must communicate project importance
- Employees should be constantly briefed on the scope, objectives, activities, and updates in the project

O ESCC Key Concept

Communications with Employees Should Focus on the Positive Aspects of ERP, Emphasizing the Growth Opportunities in Situations that May Have at First Looked Like Problems!

CSF #11: Shared Context of Growth and Expansion

- ERP projects that are viewed by managers and employees in terms of growth and expansion, rather that in terms of downsizing and cost cutting, have a higher chance of success because they generate more enthusiasm.
- ➤ Managers and employees will rally around important strategic initiatives in ways that rarely happen when the focus is completely on cutting cost.

O ESCC Key Concept

ERP Must be Seen as an Invigorating Opportunity to Grow the Business and Expand Markets, Rather than an Occasion for Cutting Jobs!

CSF #12: The ERP Production Database Must Be Self-contained and Stable

- >With ERP, the production database supports all business processes within the natural boundaries of the software.
 - Data is entered once and shared across the enterprise.
- ➤ If data sources fall outside the ERP solution boundary (as in many public sector implementations), and if incoming data quality is low, the probability of failure is enhanced.

O ESCC Key Concept

High Data Quality Is the Key to Rapid Post-Go-Live Stabilization!

CSF #13: An Implementation Team that Understands the Technologies, and a Project Management Team that Understands the Technologies as Well as the Business

- ➤No on the job training
- ➤Not traditional program office people

O ESCC Key Concept

10 people at \$300/hour Who Know What They Are Doing, Are Better than 100 People at \$100/Hour Who Are Learning on the Job!

CSF #14: A Governance Model that Supports Rapid Decision Making

- Empower the GS 14-15's with decision making authority
- ➤ Reduce IPT's (Too much time invested momentum gets lost)
- >48 hour turnaround on all configuration or critical project decisions

O ESCC Key Concept

Crisp Decision Making and Control Across Stovepipes Is Essential!

CSF #15: ERP Implementations Are Enterprise Transformation Projects, Not Information System Implementation Projects

- A management approach that focuses on transforming the enterprise must be used, with the associated system being of secondary importance.
- ➤ Contractual approaches for implementing systems (i.e., programs) in stovepiped organizational domains will not work with integrated enterprise software.

O ESCC Key Concept

Business Dominates – Technology Enables!

Mitigating Strategies

End-to-End Business Process Integration

- Designed to enable Policy as required by the Office of the Secretary of Defense
 - Enables the requirements of the Force-Centric Logistics Enterprise

Integrated Solution

- ➤ All relevant enterprise data for the business process domain instantaneously available without data aggregation through complex interfaces
- ➤ Based on Enterprise Services Architecture and enabled by technology

Implementation Management and Monitoring Environment

- ➤ Complete synchronization
- >Leveraging all aspects of the value proposition
- >End-to-End scenario integration
- ➤ Business Process Management (BPM)

Product Lifecycle Management

- ➤ Total Lifecycle Management From Acquisition, through Sustainment, to Disposal
- ➤ Technical Data Integration One set of technical system data shared across the enterprise
 - · Structured product data
 - Integrated interactive technical manuals to support all levels of maintenance
 - Integrated shop floor and manufacturing execution in a depot environment

Data Integration

- Master and transactional data integration across a complex system landscape
 - Enterprise standard software solutions
 - Unique proprietary developed software solutions

Mitigating Strategies

Supply Chain Management

- Deliver what is needed from "factory to foxhole" across Joint, interagency and multinational theater
 - Advanced Planning and Scheduling with a global view
 - Supply Chain Execution that includes multiple carriers with complex configured processing

Supply Chain Visibility

- Materiel and asset visibility through a global order fulfillment process
- ➤ Performance monitoring by business process

Technical Data Identification and Standardization

- >Identifying critical data sources and data types
 - Engineering Design
 - Structured Technical Data, including BOMs and Variants
 - Engineering Data
 - Technical Manuals
 - Other structured and non-structured product data
- Identifying appropriate commercial standards for enabling the enterprise standard software environment
- ➤ Total support for the Lifecycle Management Center (LCMC) concept

Mitigating Strategies

Architecture-Driven Data Integration

- Master data sources identified and linked to the Solution Architecture
- Extract, Transform, and Present (ETP) and Extract, Transform, and Load (ETL) using an integration suite of tools
- ➤ Solving data problems before they occur as opposed to during post go-live stabilization - the front-end enabler for true Master Data Management

ERP Solution Re-documentation in Support of Stabilization and Optimization

➤ Reverse engineer the scope, processes, and the customization of a production ERP instance

Federated Architecture

- >Provide an enterprise wide perspective
- Align independent architectures together using a proven federated methodology

Business Process

A Business Process is a sequence of functions that are executed by organizational units, according to appropriate process logic, using the necessary data. This ensures that an overriding task (relating to certain objects) is completely carried out (Kirchmer, 1998).

Business Process Architecture

A Business Process Architecture is a hierarchically decomposable documentation of the totality of the business processes that are planned or implemented to enable an enterprise. The architecture is usually documented using a particular modeling methodology and is stored in an object linked repository. Architectures usually contain other views in addition to the business process view.

Cross-Functional Business Process

A business process that spans organizational domains is called a Cross-Functional Process. These domains could be defined by an organizational chart; e.g., sales, production, shipping, etc. They could also be defined by the informal organization; e.g., political or budgetary boundaries.

Enterprise Architecture Planning

Enterprise Architecture Planning is the process of defining and documenting a plan (i.e., a blueprint) for the use of information in support of the business processes of an organization. Enterprise Architecture Planning also includes the plan for implementing against the requirements as documented in the architecture. Enterprise Architectural Planning is a business responsibility and it is executed by line personnel within the organization. Technologists play a supporting role, but they should never be given the task of developing an enterprise architecture.

Enterprise Application Integration

Enterprise Application Integration (EAI) is the sharing of data and business process logic across hetero/homogeneous instances through message-oriented-middleware (MOM). EAI may be managed by packaged vendors [SAP ALE or Oracle OAI] or through solutions provided by 3rd party vendors (e.g., IBM, WebMethods, etc.). EAI is sometimes called Application-Centric Interfacing.

Enterprise Integration

Enterprise Integration is the vertical and horizontal alignment of plans, business processes, and information systems across organizational and functional boundaries to provide competitive advantage. The process of achieving Enterprise Integration includes all managerial and technological factors that enable Cross-Functional Process Integration. The result is a customer oriented management structure with information systems that are formally linked to processes and the integration of processes needed to establish/retain customer satisfaction.

Enterprise Resource Planning (ERP)

ERP is the popular name in the USA for Standard Software Solutions. ERP provides modularly integrated business applications across the enterprise. ERP systems have their origins from two sources: Manufacturing Resource Planning systems and Financial Accounting systems. MRP software provides added human resource, financial, and other functionality to evolve into an ERP system. An example of this type of Standard Software Solution is Baan V. Financial Accounting solution providers added human resource, manufacturing, and other functionality to evolve to an ERP system. An example of this type of Standard Software Solution is Great Plains eEnterprise.

Extended Enterprise Integration

Extended Enterprise Integration is inter-enterprise integration. Intra-enterprise integration is extended to incorporate other entities into the integration domain. These other entities include customers, suppliers, partners, and other organizational claimants

Future Logistics Enterprise (FLE)

Is an integrated set of six collaborative initiatives to achieve end-to-end customer service within Department of Defense logistics operations. The primary intent of the FLE is to accelerate DOD's implementation of integrated logistics chains and commercial information systems to meet warfighter sustainment needs and the operational requirements of the National Defense Strategy. The FLE is focused on those mid-term policy, process, and systems changes the DOD must make in order to continue to effectively support our warfighting customers. The six collaborative initiatives are: Depot Maintenance Partnerships, Condition-Based Maintenance +, Total Life Cycle Systems Management, End-to-End Customer Service, Executive Agents, Enterprise Integration

Implementation Methodology

An Implementation Methodology is a collection of principles, tools, and techniques for designing and implementing Standard Software. The Implementation Methodology provides a mechanism for documenting the collective experience of the implementation team. The benefits of following an Implementation Methodology are reduced implementation cycle times, reduced total implementation costs, and reduced failures, rework, and confusion over what to do next. Examples of Implementation Methodologies are Accelerated SAP (ASAP), Oracle Application Implementation Methodology (AIM), Oracle Fast Forward, etc.

Master Data

In the SAP software solution, data relating to individual objects, which remains unchanged over an extended period of time. Master data contains information that is used in the same manner for similar objects. Examples would be the master data of a supplier containing name, address, and banking information, or the master data of a user in the R/3 System, containing the user's name, authorizations, default printer, etc

Procedural Model

A Procedural Model is a project management model. The model is represented as a process. Our methodology for documenting procedural models is the extended event-driven process chain (e-EPC) diagram. The functions in the e-EPC diagrams may be associated with any number of attributes, including cost, schedule, word documents, video clips, audio clips, etc. Implementation procedural models may be used to generate what-if scenarios, as well as providing the structure for discrete next-event simulation exercises.

Process-Oriented Implementation

Some Standard Software is designed to execute predefined business processes. The information system (resulting from the software implementation) is aligned with the business process, enabling process management and cross-functional process integration. The standard software modules are designed so that they explicitly execute a best practice business process. This process is called the Reference Business Process or Reference Model.

Reference Model

A set of pre-engineered and integrated organizational views. For example one type of reference model might be a business process (one view of an organization) and a depiction of the data flows (another view of an organization) that are aligned with the business process. Standard Software either implicitly or explicitly executes pre-defined business processes; hence, by definition it is based on the reference model concept. The main benefit of a reference model is that certain tedious views (e.g., the data view as realized in a data model) do not have to be individually developed for every implementation. The idea is to design and develop once, and then replicate many times. The reference model may have to be tailored for individual organizations, but this effort is significantly less than approaching each implementation as a new software project.

Supply Chain Management (SCM)

Supply Chain Management (SCM) is a strategy where buyers and sellers collaborate to bring greater value to the customer. The Collaboration includes Supply Chain Planning and Supply Chain Execution activities. Effective supply SCM enables business to make informed decisions along the entire supply chain, from acquiring raw materials to manufacturing products to distributing finished goods to the consumer. At each link, businesses need to make the best choices about what their customers need and how they can meet those requirements at the lowest possible cost. Supply Chain Integration enables SCM. Supply chain applications can provide benefits such as reduced costs, improved quality and product design, and effective inventory management.

Value Chain

As a product moves from raw material to finished good delivered to the customer, value is added at each step in the manufacturing and delivery process. The value chain indicates the relative amount of value added at each of these steps. In general, a value chain indicates a sequence of business process objects that adds additional value at each step. Feedback loops are permitted.

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 See all the Army architectures
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- http://www.mbtmag.com/
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